

Specification Amendments

[0006] In some internal combustion engines, the rocker arm and valve activation device are connected by a separate ball and socket joint. The ball typically has a pin extension on the opposite side of a concave circular surface. The pin extension has a conical or cylindrical shape and is inserted into a hole formed in the end of the rocker arm. The socket has a convex surface on one side [[of]] that forms a cavity. The socket connects to the valve activation device on the side opposite the convex surface. When assembled, the ball is positioned inside the cavity of the socket so that the concave surface of the ball is adjacent to the convex surface of the socket. The ball and socket usually are held together by a retention mechanism such as a spring or a wire.

[0010] The ball and socket joint further may be held together by a folded radial edge or lip along the inside of the entrance to the cavity in the socket. If the ball is inserted into the socket after the radial edge is folded, the ball may have to be forcibly inserted into the socket. The forcible insertion may damage the radial edge and the ball. The radial edge may obstruct the rotational movement of the ball in the socket. The radial edge may block the movement of the concave surface when the ball rotates. The pin extension may strike the radial edge.

[0035] FIG. 8 shows another [[a]] ball and socket joint 810 having [[has]] a ball portion 860, a socket portion 870, and retention device 880. The ball portion 860 is configured to rotate or move within the socket portion 870. The retention device 880 holds the ball portion 860 and the socket portion 870 together. The ball portion 860 may be connected to or inserted in a rocker arm in a valve operating system. The socket portion 870 may be connected to a valve or valve bridge for a cylinder of an internal combustion engine. The ball portion 860 is essentially the same as the ball portion previously discussed. The ball portion 860 has a pin extension 862, an interface surface, and a flange 866. The socket portion 870 is essentially the same as the socket portion previously discussed. The socket portion 870 forms a cavity with an entrance or opening 874 at one end and a foot segment 876 at the opposite end. The socket portion 870 also forms an exterior groove 878 between the entrance 874 and the foot segment 876. The retention device 880 is essentially the same as the retention device previously discussed except for the pin segment. The retention device 880 has a bridge segment 882 between a pin segment 884 and a foot segment 886. The foot segment 886 forms a foot loop [[890]]290. The pin segment 884 forms a plurality of windings around the pin extension 862. A plurality of windings includes any number of windings and partial windings greater than about one winding. The plurality of windings form multiple pin loops, which may have the same or different cross-sections. The multiple windings may create a spring-like or bias effect to hold the ball portion 860 against the socket portion 870.